

ITN ENERGY SYSTEMS

LOW-COST FLEXIBLE ELECTROCHROMIC FILM FOR ENERGY EFFICIENT BUILDINGS

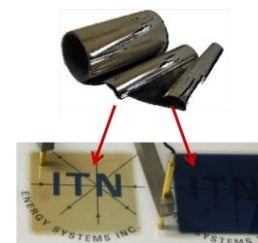
PROJECT TITLE:	Low-Cost Electrochromic Film on Plastic for Net-Zero Energy Building		
ORGANIZATION:	ITN Energy Systems, Inc.	LOCATION:	Littleton, CO
PROGRAM:	FOA1	ARPA-E AWARD:	\$4,886,155
TECH TOPIC:	Building Efficiency	PROJECT TERM:	1/1/10 – 12/31/12
WEBSITE:	www.itnes.com		

CRITICAL NEED

Buildings account for 40% of all energy used in the U.S., and windows alone are responsible for 25% of the energy consumed by a typical building. Electrochromic windows can reduce cooling requirements in summer and heating requirements in winter by applying electric current changes the window's color, and thereby its heat transmission properties. The primary challenge to broader adoption is the high cost resulting from small-scale manufacturing of electrochromic film onto rigid surfaces.

PROJECT INNOVATION + ADVANTAGES

ITN is addressing the high cost of electrochromic windows with a new manufacturing process: roll-to-roll deposition of the film onto flexible plastic surfaces. Production of electrochromic films on plastic requires low processing temperatures and uniform film quality over large surface areas. ITN is overcoming these challenges using its previous experience in growing flexible thin-film solar cells and batteries. By developing sensor-based controls, ITN's roll-to-roll manufacturing process yields more film over a larger area than traditional film deposition methods. Evaluating deposition processes from a control standpoint ultimately strengthens the ability for ITN to handle unanticipated deviations quickly and efficiently, enabling more consistent large-volume production. The team is currently moving from small-scale prototypes into pilot-scale production to validate roll-to-roll manufacturability and produce scaled prototypes that can be proven in simulated operating conditions. Electrochromic plastic films could also open new markets in building retrofit applications, vastly expanding the potential energy savings.



IMPACT

If successful, ITN's roll-to-roll processing technique would lower the cost of electrochromic windows to the point that building developers will use them in new installations and in retrofitting existing buildings, reducing heating and cooling costs up to 40%.

- **SECURITY:** Improving the energy efficiency of our buildings reduces pressure on the electrical grid, improving its stability.
- **ENVIRONMENT:** Better building efficiency would limit electricity consumption and reduce greenhouse gas emissions.
- **ECONOMY:** Improvements in heating and cooling efficiency can save homeowners and businesses thousands of dollars on their utility bills.
- **JOBS:** Building retrofits could create job growth in the American manufacturing, construction, and engineering sectors.

CONTACTS

ARPA-E Program Director:
Dr. Mark Johnson,
mark.a.johnson@hq.doe.gov

Project Contact:
Dr. Bruce Lanning,
blanning@itnes.com

Partner Organizations:
Electric Power Research Institute, SoCal
Edison, MAG Industrial Systems,
Colorado School of Mines